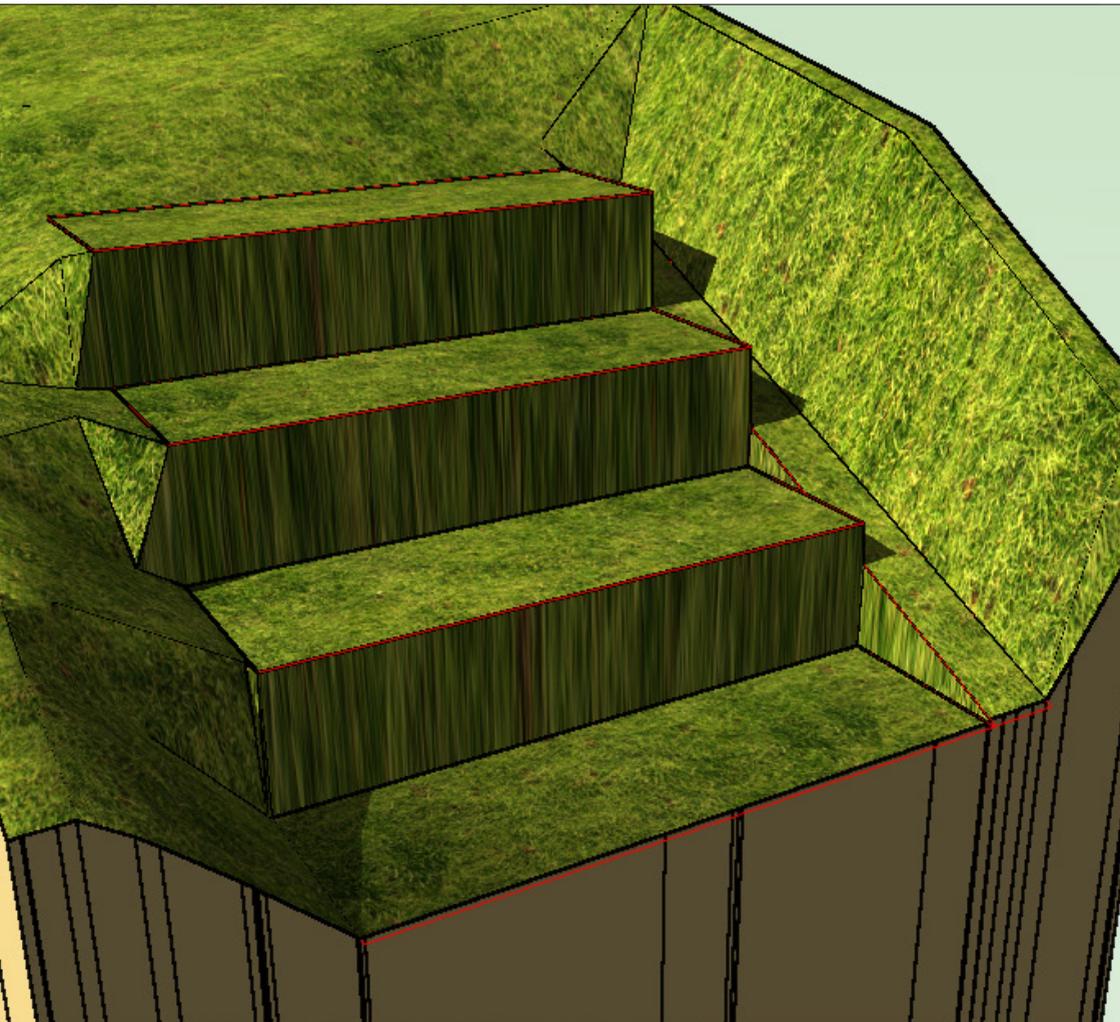


SHORT SHARP MANUALS

1507

Site

Modifiers



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For more Vectorworks training information, or to purchase more copies of this book, please email jon@archoncad.com

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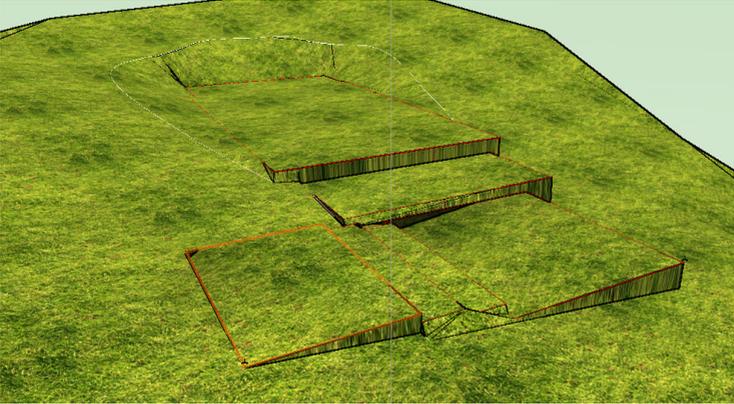
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Introduction

What Is A Site Modifier

After you have created your site model you will almost certainly want to make changes to it. In the manual on site modeling [link] you will of learned how to create the site model from data taken from a real site.

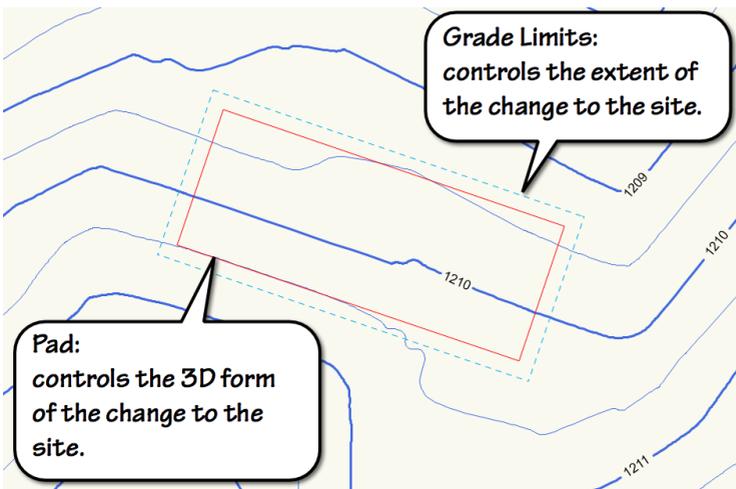
Once you have the natural land modeled, it is common to want to modify the site to set your design. This is where site modifiers come in. Site modifiers allow you to make changes to your site model.



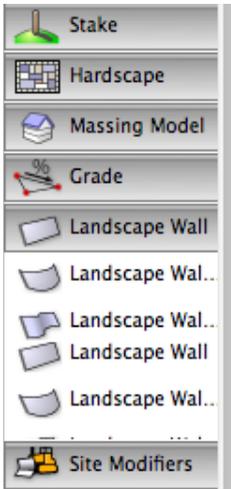
How Does It Work?

There are usually two parts to a site modifier; the 3D Object and the Grade Limits. The 3D part controls the changes to the site, and the Grade Limits controls how much of the site is affected.

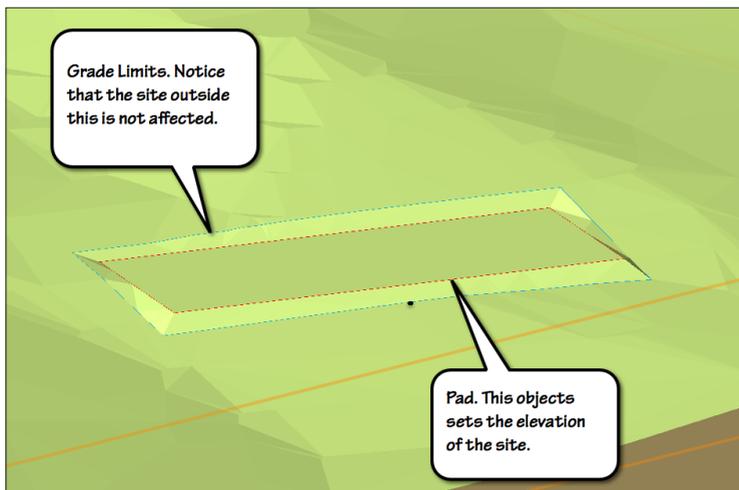
You can create site modifiers without grade limits, but that will not give you any control over the extent of the site modification.



Vectorworks includes a several tools for creating site modifiers. Some tools are designed to create other objects (hardscape, massing model, roads, etc), and they have options to create site modifiers as well. Some tools are designed to report information about the site or they can be used as site modifiers (Stake, Grade). The Site Modifier tool is designed to create Site Modifiers only.



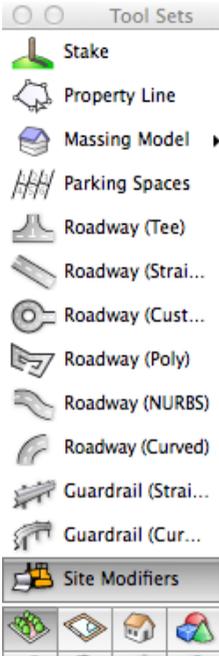
When you look at the site in 3D you can see that the pad set the elevation while the Grade Limits is controlling how much of the site should be changed.



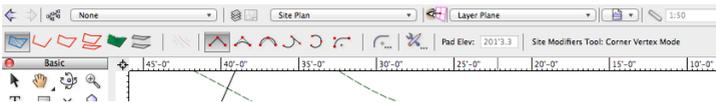
Pads and Grade Limits

Pads and boundaries are the main tools for site modifying. The pad creates the 3D Site Modifier and the Grade Limits tells Vectorworks how much of the site will be affected. You can use the **Site Modifier** tool from the **Site Model** toolset, but it is often easier to use a command to convert objects to site modifiers.

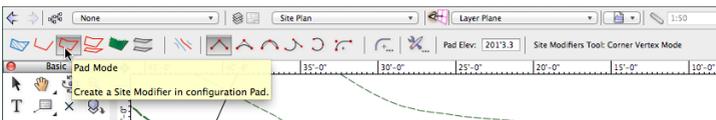
- Go to the **Site Planning** tool set.
- Click on the **Site Modifier** tool.



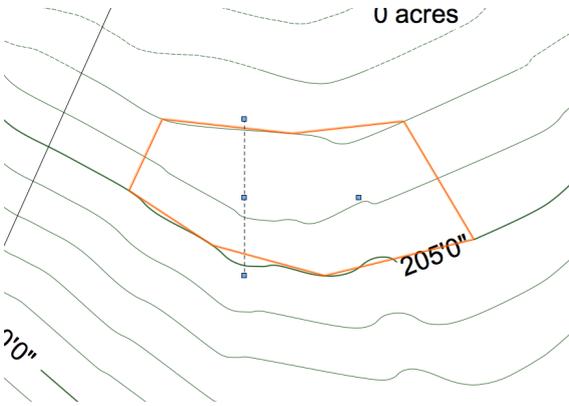
- Go the **Tool** bar.
- There are six modes for placing site modifiers.



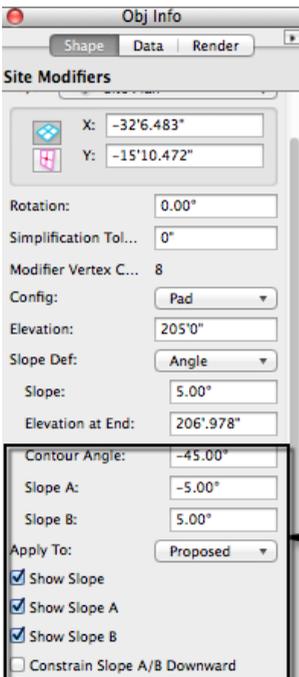
- Click on the third mode. This is the mode for placing a pad.



- Change to a **Top** or **Top/Plan** view.
- Draw a shape for the pad.

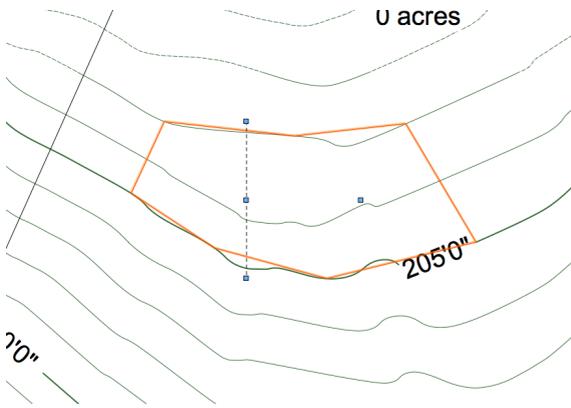


- When you have finished creating the shape, go to the **Object Info** palette.
- Check the configuration to make sure the object is a **Pad**.
- Enter the required elevation for the pad.



new in
Vectorworks
2016

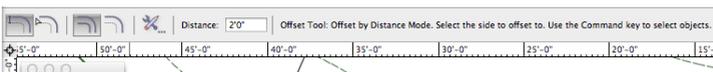
- This has created the first part of the site modifier, but you will still need to create a **Grade Limits**.



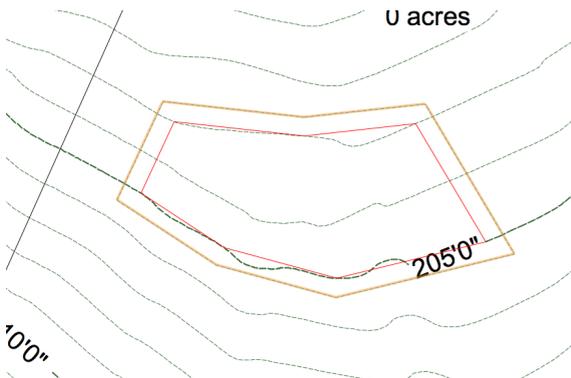
- An easy way to create a **Grade Limits** is the use the **Offset Tool** to duplicate the pad that you already have.
- Go to the Basic full set and click on the **Offset** tool.



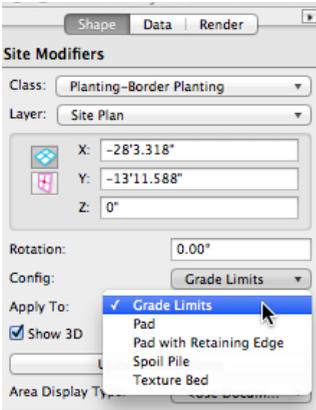
- Choose the preferences to give the required offset.



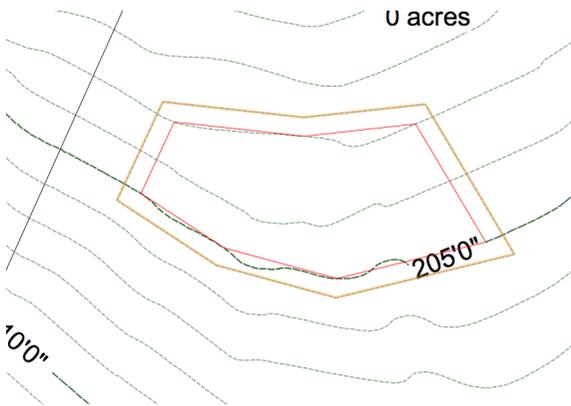
- Click outside the pad to create the offset. When you use pad with a **Grade Limits**, the pad has to be totally inside it.



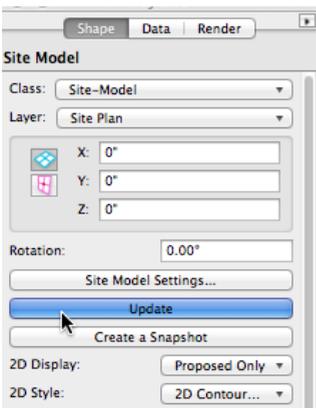
- With the offset object still selected, go to the **Object Info** palette.
- Click on the **xpop-up** menu and choose **Grade Limits**.



- Usually when you change the object from a pad to a grade limits it changes color from red to blue.

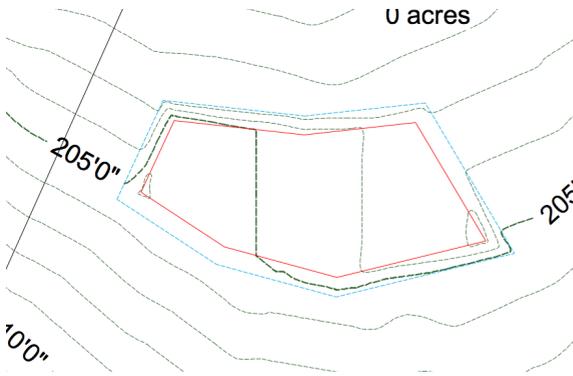


- Select the Site model.
- Go to the **Object Info** palette.
- Click on the **Update** button to update the site model.

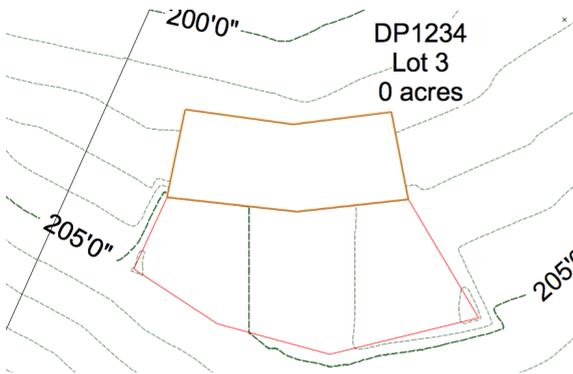


- Depending on the site model options, you should see the contours

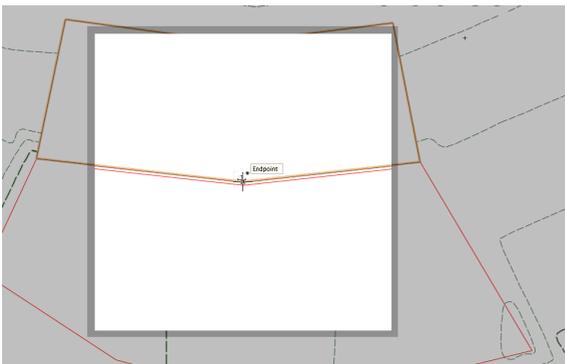
update.



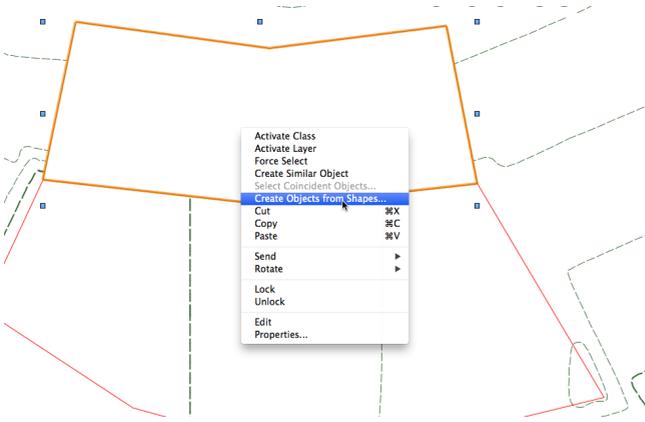
- Select the **Grade Limits**.
- Delete it.
- Draw another shape, using the **Polygon Tool**.



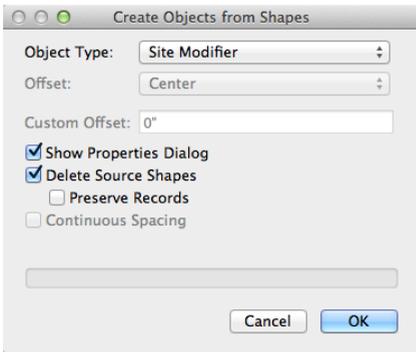
- Make sure you are not touching or overlapping the first shape. Pads cannot overlap, pads and grade limits cannot overlap. An easy way to do this is to use the Offset Tool to offset the object by a very small amount (1mm or /132").
- They can be very close.



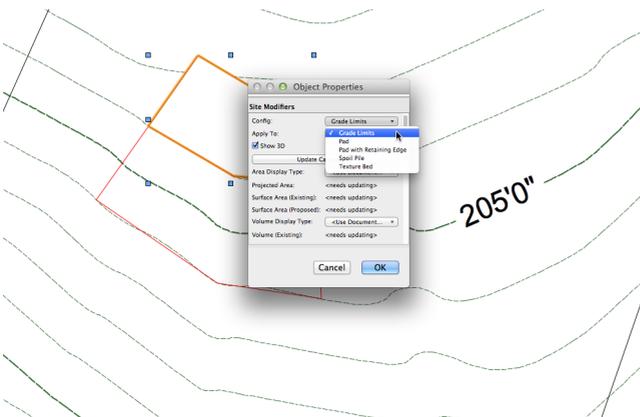
- Right click on the new shape.
- Choose **Create Objects From Shapes...**



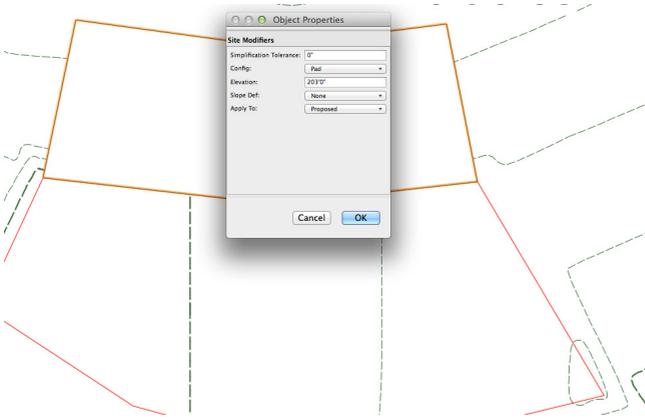
- From the **Object Type** pop-up menu choose **Site Modifier**.
- **Show Properties Dialog**.
- **Delete Source Poly**.
- Click on the **OK** button.



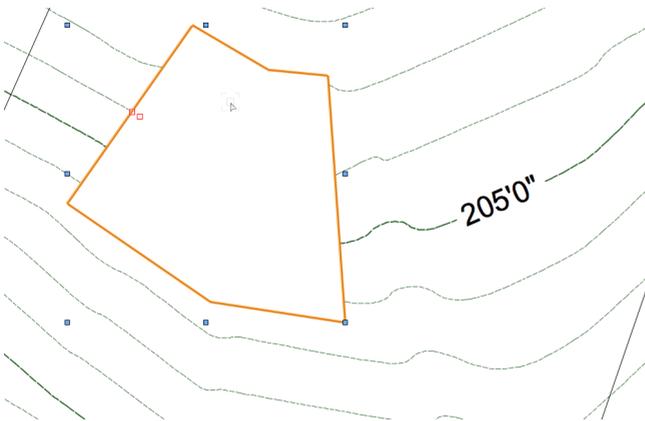
- From the Config pop-up menu choose **Pad**.
- Set the **Elevation** to a suitable level.



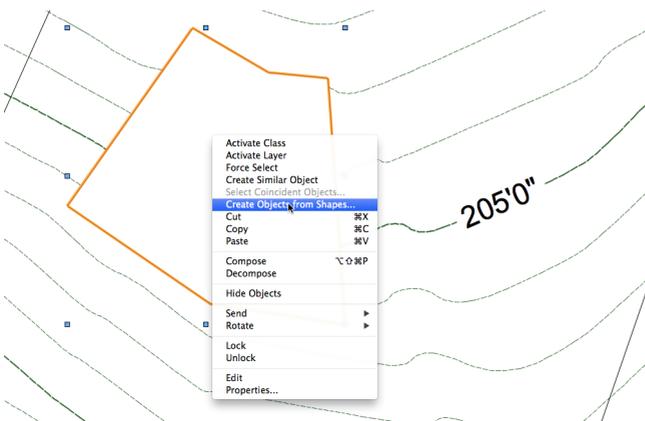
- Click on the **OK** button.



- The shape has been made into a pad and it has a red color.
- Draw polygon over the two pads.

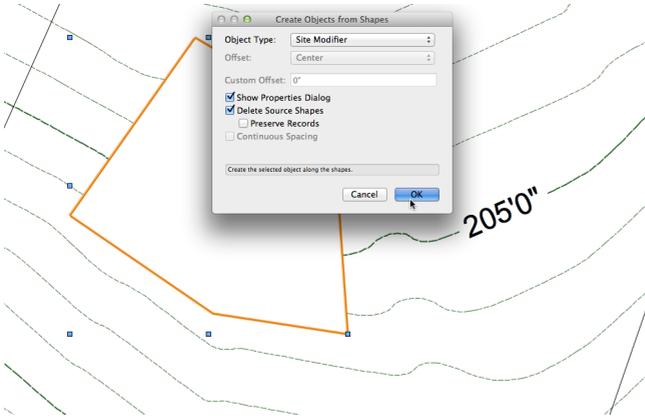


- Use the **Offset Tool** to offset it (do not make a copy of it).
- Right click on the new shape.
- Choose **Create Objects From Shapes...**

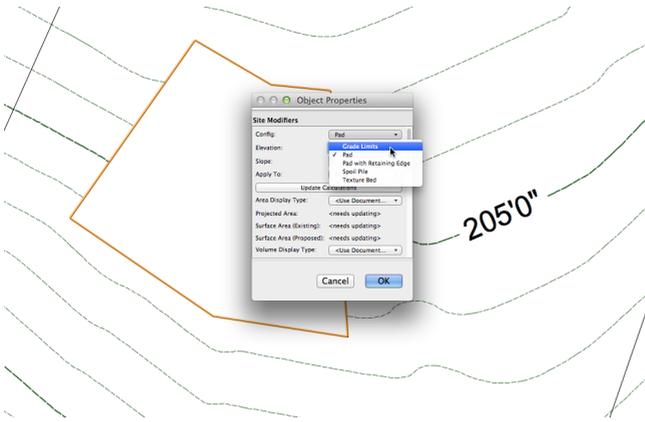


- From the **Object Type** pop-up menu choose **Site Modifier**.
- **Show Properties Dialog**.

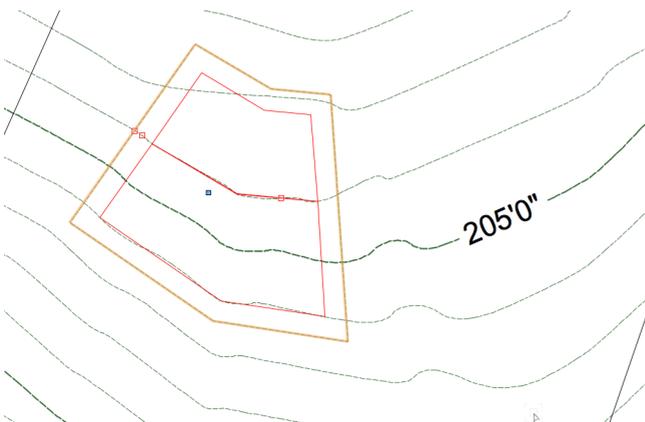
- **Delete Source Poly.**
- Click on the **OK** button.



- From the Config pop-up menu choose **Grade Limits**.

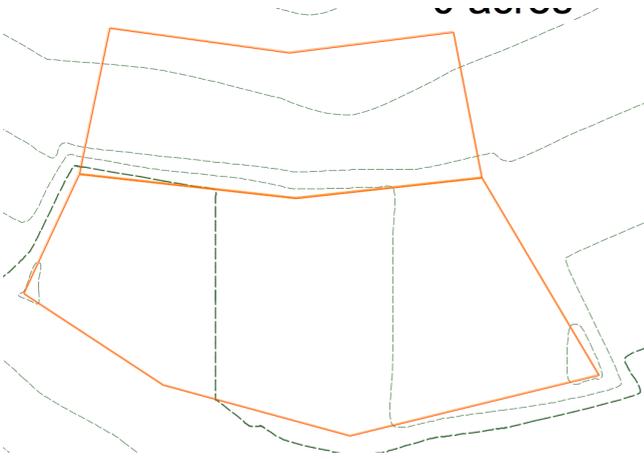


- Click on the **OK** button.

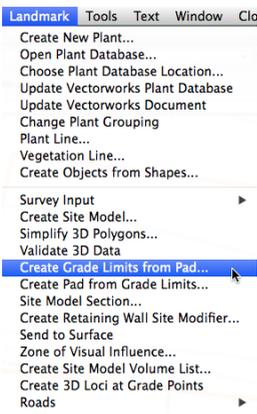


If you are using Vectorworks Landmark, there is an easier way to make the Grade Limits.

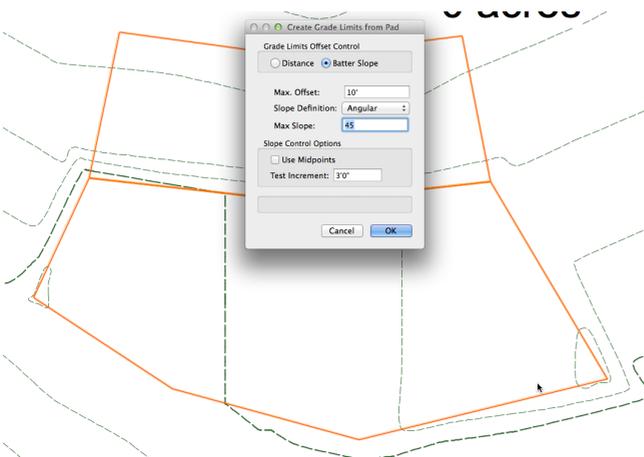
- Select both pads.



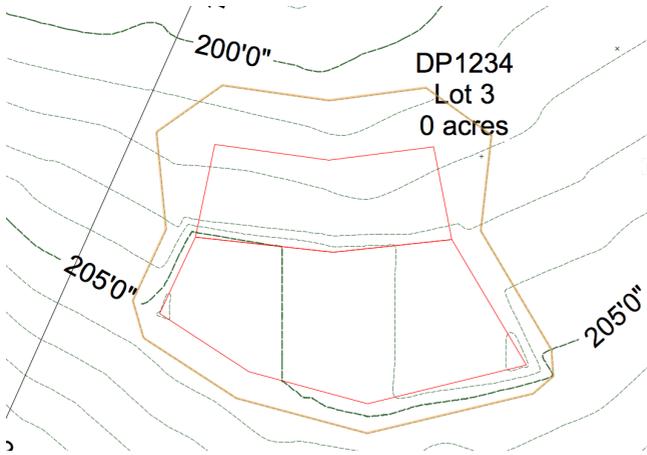
- Go to the **Menu** bar.
- Choose **Landmark > Create grade Limits from Pad...**



- Set the option you require, using the **Distance** (how far from the pad) or the **Batter Slope** (the slope from the pad to the site).



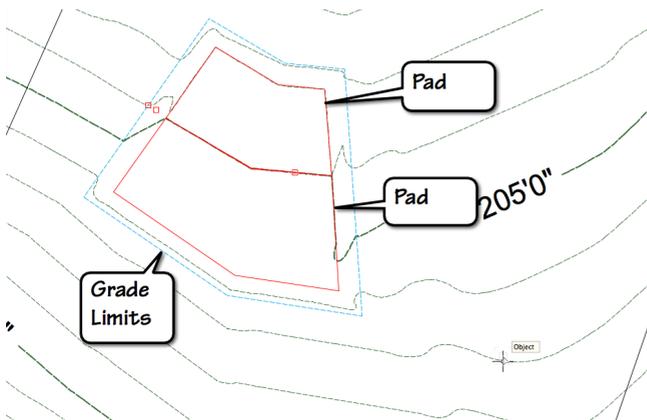
- Click on the **OK** button.
- The Grade Limits will be made for you, based on your settings.



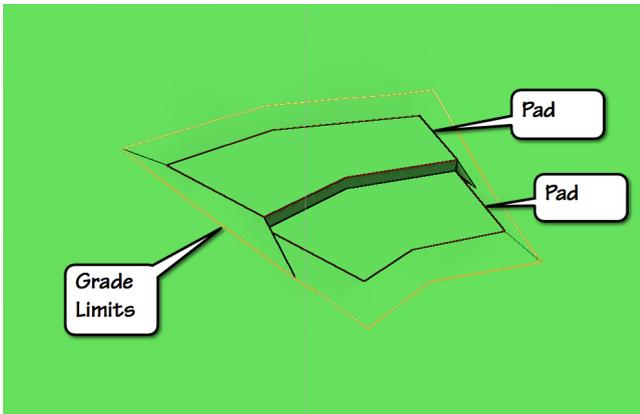
- Right click on the site model.
- From the contextual menu choose **Update**.



- In this case I have two parts to the site modifiers, two pads and one grade limits.



- If you change to a 3D view you can see the pads and grade limits.

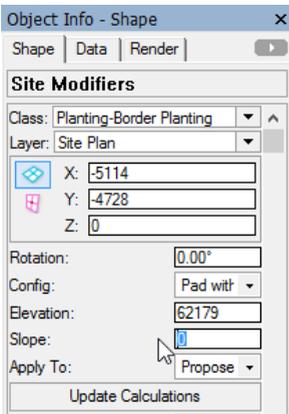


- After you have created the Site Modifiers, you can edit them using the **Object Info** palette.

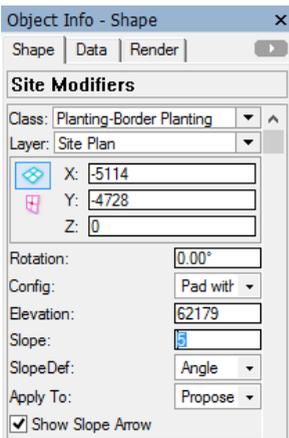
Pads with Slope

So far, the pads we have created have been flat, that is they have no slope. You can add slope to the pads by adjusting the angle (or slope) on the **Object Info** palette.

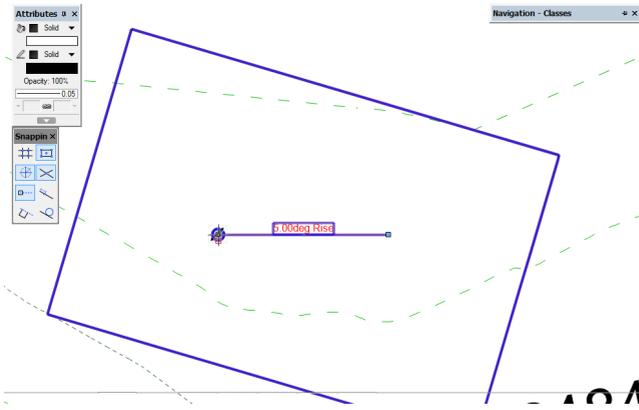
- Select the required pad.
- Go to the **Object Info** palette.
- Prior to Vectorworks 2016 the pad could only have a slope in one direction.
- This is the **Object Info** palette for a pad using Vectorworks 2015.



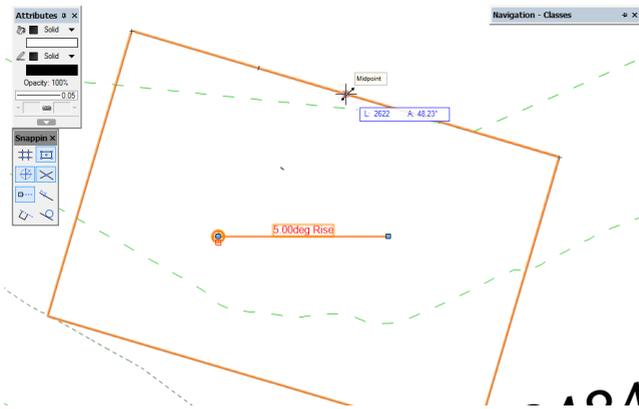
- Enter the slope on the **Object Info** palette.



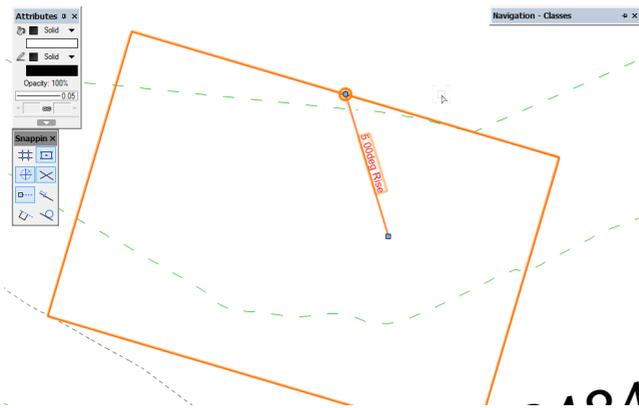
- The pad on the drawing area will now show the Slope Arrow, which you can turn on or off using the option on the Object Info palette.
- The start of the slope arrow is shown with the circle the crosshairs on it. This is also the point that controls the elevation of your pad.



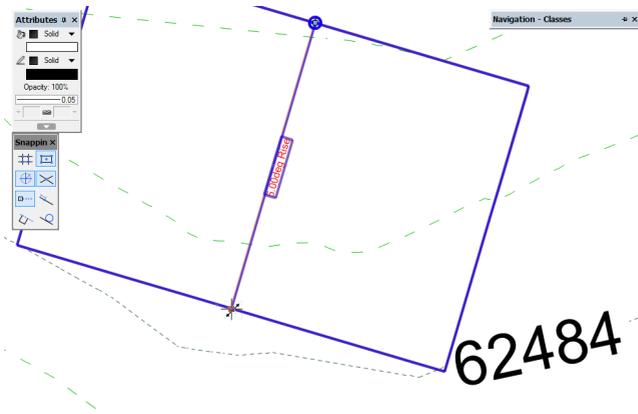
- To relocate the start of the slope arrow, use your Selection tool. When you move your cursor over the blue handle, you should notice the cursor change to a double headed arrow (the interactive scaling mode).



- When the cursor changes to the double headed arrow, click once and move your cursor to the required location for the start of the slope.

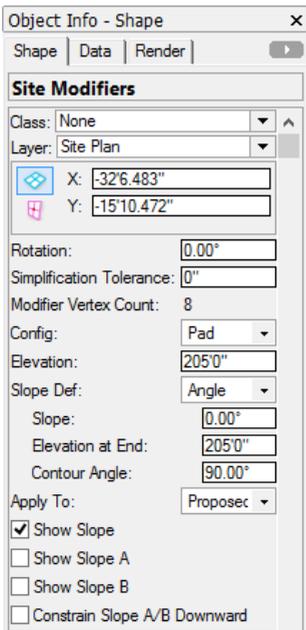


- Use the same technique for the other end of the slope definition.

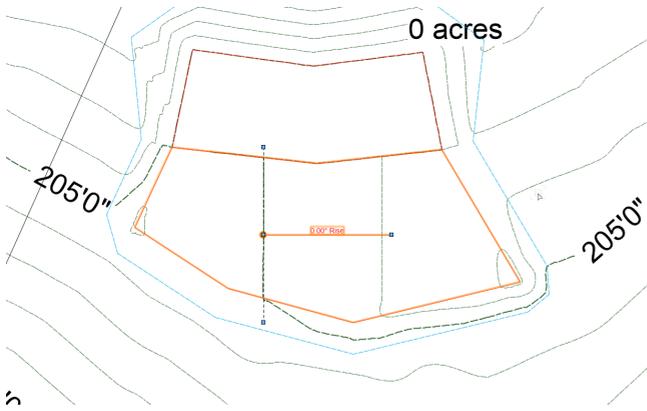


From Vectorworks 2016 onwards, pads can have a slope in more than one direction.

- This is the Object Info palette for a pad using Vectorworks 2016. Notice the changes:
 - Slope Definition** (the slope that you were able to adjust in in Vectorworks 2015 and before)
 - Elevation at End** (elevation at the end of the slope indicator)
 - Contour Angle** (this is NOT adjustable, it is the relationship of Slope A and Slope B)
 - Show Slope A** (this is the ability to turn the slope indicator off or on, and this slope is the main slope)
 - Show Slope B** (this is the ability to turn the slope indicator off or on, and this slope is the cross slope)

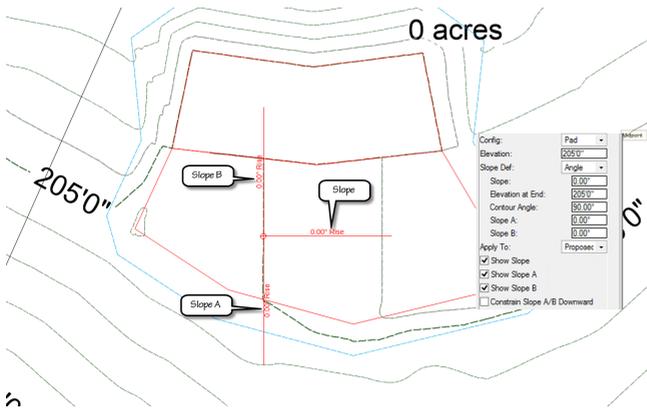


When you **Show Slope**, this is what you see. Notice that you can still see the dashed line and the control handles for **Slope B**.



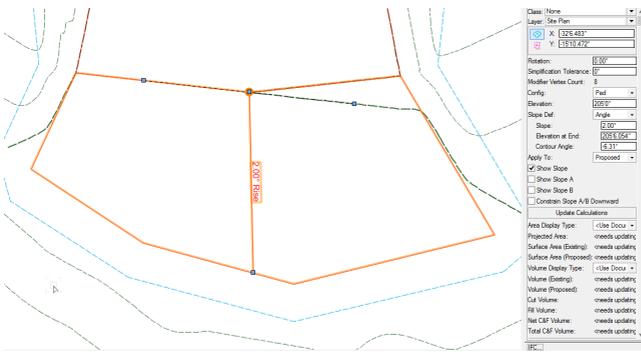
When you **Show Slope**, **Show Slope A**, and **Show Slope B**, you will see the angles on each slope. In this image I have labeled the parts so you can see where they are.

Slope A and Slope B look independent, but they are connected. Adjusting the slope of one will adjust the slope of the other. One slope will show the rise and the other the fall, but the slope angles and directions are connected

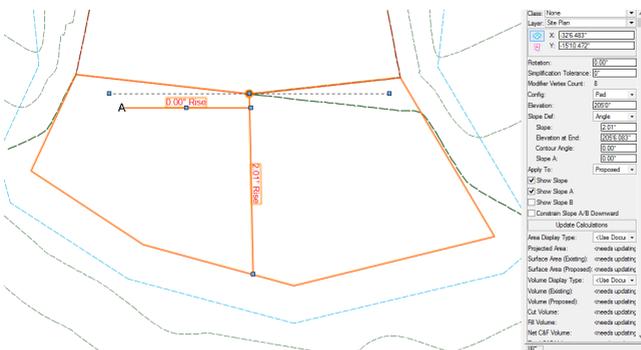


Refer to the earlier notes on the moving the slope indicator to control the start point for the slope, use the control handles to move the start of the slope indicator to the required location, and move the end of the slope indicator to the required location.

The slope indicator does not have to start and stop at the edges of the site modifier, but it might be easier for you to understand the elevations and control them more easily if you do.

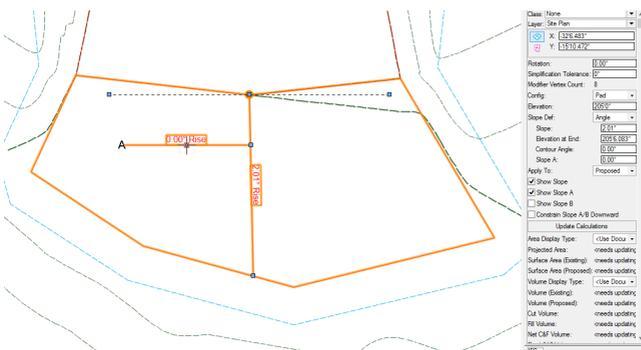


In order to see the first slope, **Show Slope A**. This will turn on the slope indicators. Use the handles on the slope indicator to move it. The slope indicator does not have to be perpendicular to the main slope as I have shown it here.

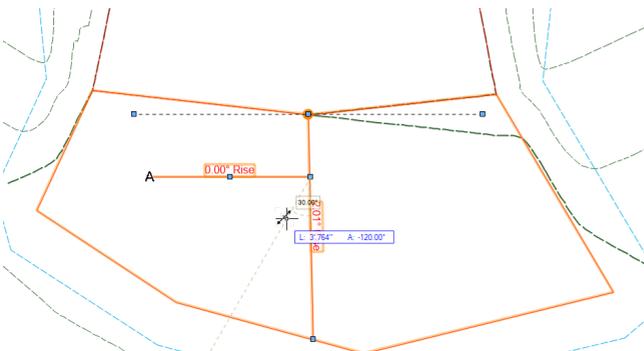
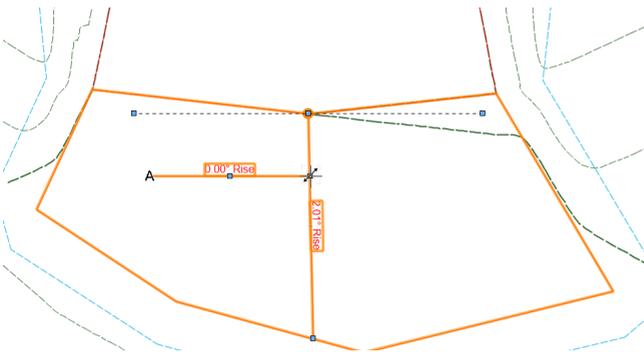
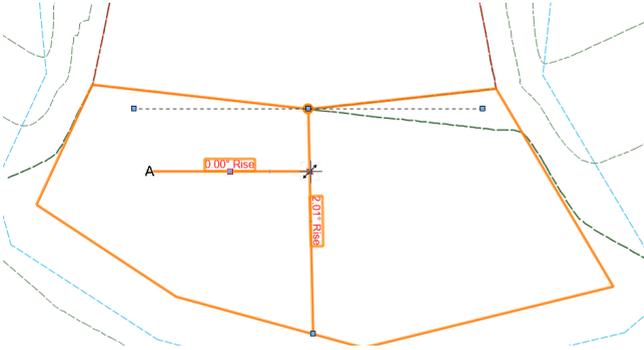
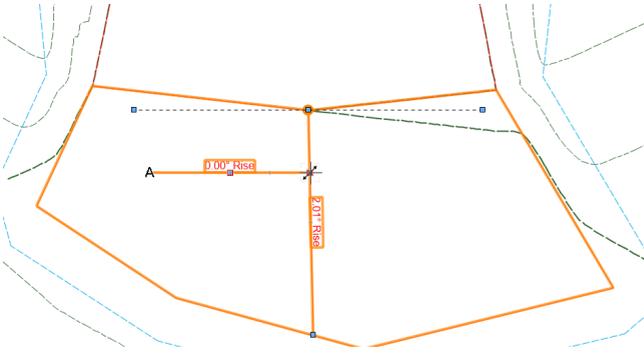


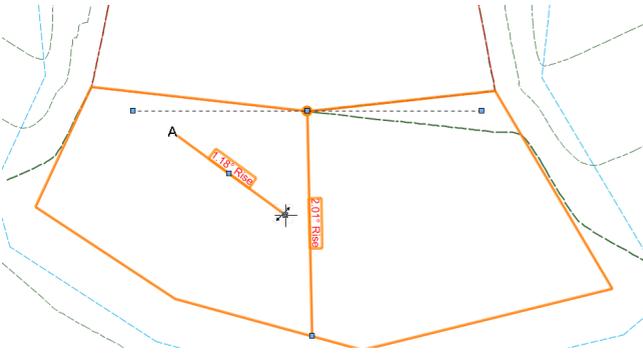
The indicator does not have to be at any specific point on the main slope indicator, you can move it where you want.

The letter A location is related to the start and end control handles, as you move the start and the end handles, the letter moves (you will see that it is the same distance away from the end handle as the start distance).

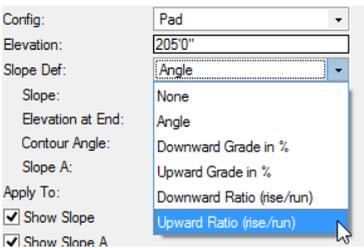


Slope A does not have to be perpendicular to the main slope. Use the Selection Tool to move the start or end handles to change the angle of Slope A relative to the main slope.

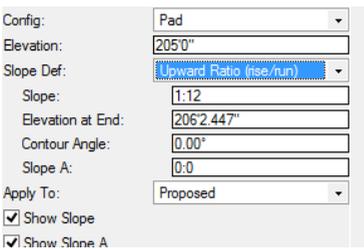




The Slope Def (slope definition) allows you to choose how the slope is defined. In previous versions you could only use angles, but now you can choose various type of slope definition.



A common requirement is to use rise over run. Choose this option, then type in the rise over run. Accessible ramps are often shown with an angle of 1:12.

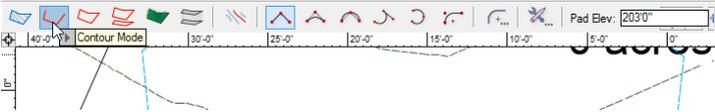


You can also enter the elevation at the start and the elevation at the end, and Vectorworks will calculate the angle for you.

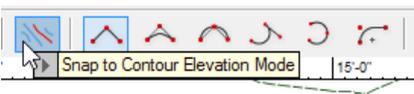
Site Modifier - Contours Mode

This mode is ideal for creating a site modifier that changes the contours. There are two ways to use it. With the first method, you set the required elevation and draw the contour shape you want. With the second method, Vectorworks will snap to an existing contour and pick up the elevation from it.

- Select the **Site Modifier** tool.
- Go to the **Tool** bar.
- Click on the **second** mode, **Contour Mode**.

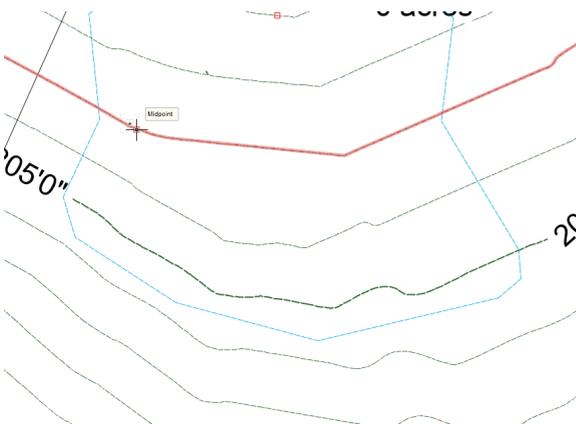


- Go to the **Tool** bar.
- Click on the **seventh** mode, **Snap to Contour Elevation Mode**. Remember to choose the required mode for the vertices. For my example I will use the Bezier curve mode



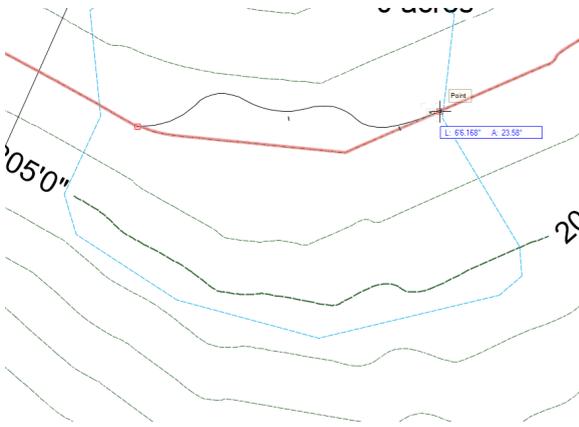
This mode will snap the new contour to an existing contour and pick up the existing contour elevation. This makes it easy to change the contours (you can use this to fix existing site models as well as creating proposed site models).

- Start by snapping onto an existing contour. It will highlight.
- Click once to start.

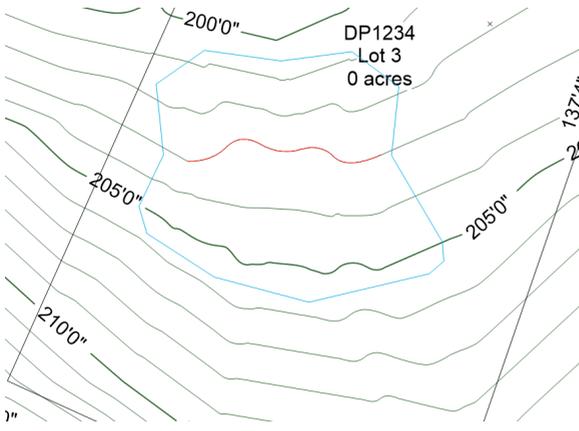


- Keep clicking to place as many vertices as required.

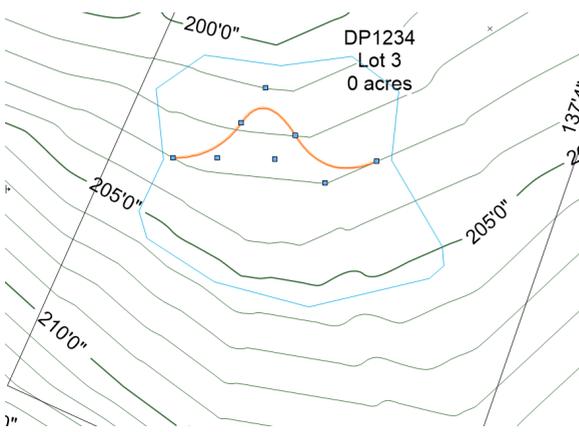
- You do not have to finish back on the same contour (the one you started on), but in this example I have.



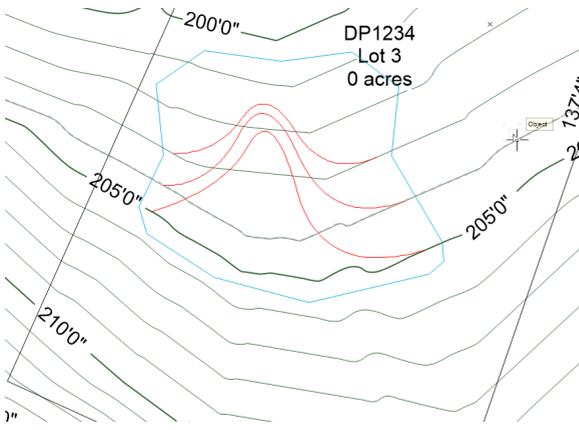
- Update the site model to see the changes.



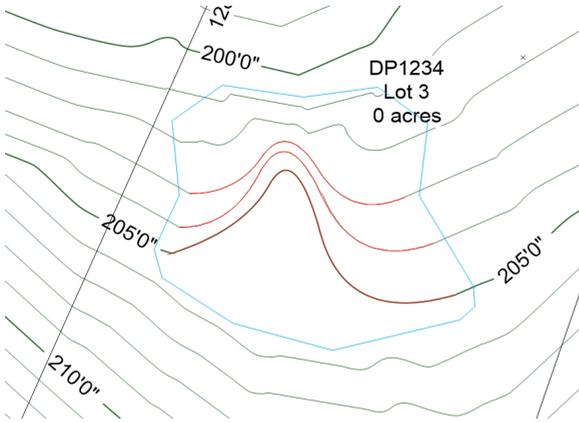
- The site modifier can be edited with the Reshape tool to get the required curve.



- Add as many site modifiers as required. In this example I have snapped all the proposed contours to existing contours. This makes it easy to get them at the correct elevation.



- Update the site model to see the changes.



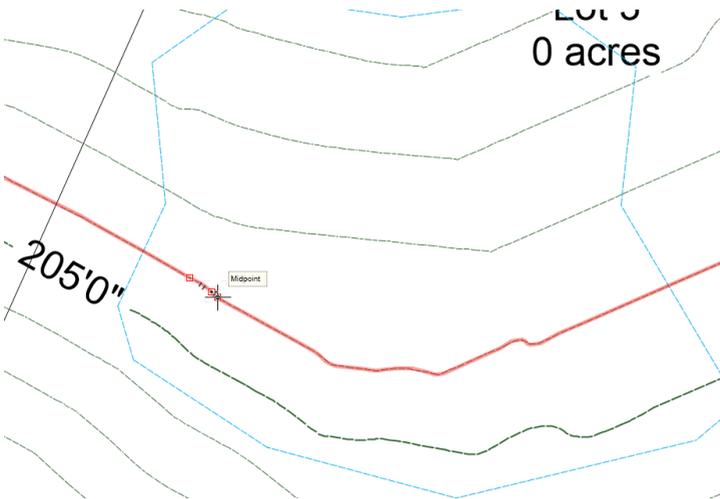
Site Modifier - Pad With Retaining Edge

This mode can be used without a grade limits because the retaining edge can be used as an edge, like a grade limits right next the pad. You can edit the elevation of the retaining edge to suit the design, but an easy way to fit the retaining edge to the site model is to use Send to Surface.

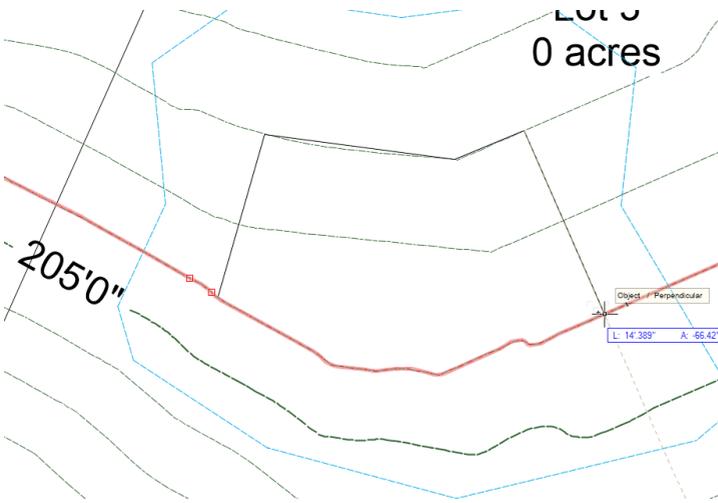
- Select the **Site Modifier** tool.
- Go to the **Tool** bar.
- Click on the **fourth** mode, **Pad with Retaining Edge Mode**.



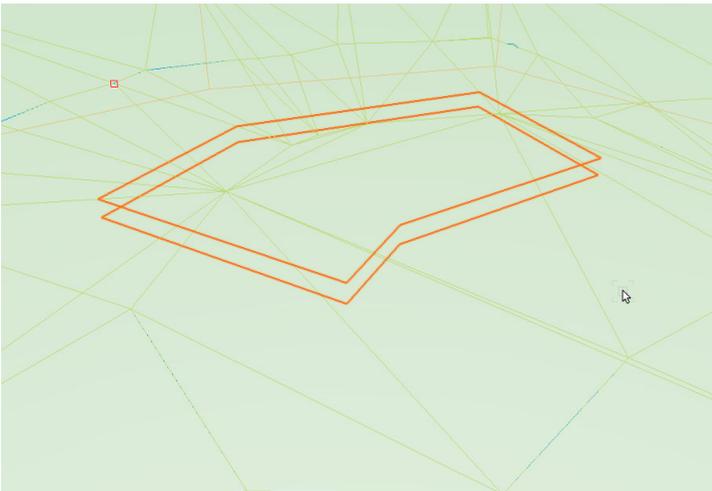
- Go to the **Tool** bar.
- Click on the **seventh** mode, **Snap to Contour Elevation Mode**. Remember to choose the required mode for the vertices. For my example I will use the Corner curve mode



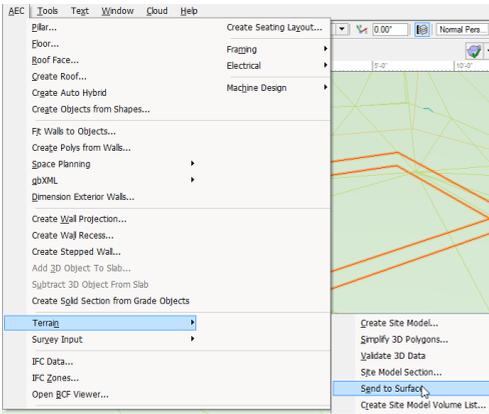
- Draw the required pad shape.



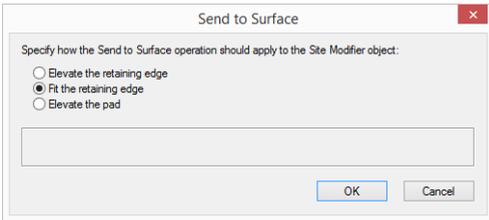
- Before you update the site model, change to a 3D view. You can see the pad and the retaining edge. You can't see the two parts in plan, but you can in 3D.
- At the moment the retaining edge is offset from the pad. This would be acceptable if that's what you want, but you can also use the send to surface command to fit the retaining edge to the surface of the site model.



- Go to the **Menu** bar.
- If you are using Architect, choose **AEC > Terrain > Send to Surface**.
- If you are using Landmark, choose **Landmark > Send to Surface**.



- This will send the retaining edge to the surface of the site model.
- You'll see a dialog box with three choices. The first two choices will give similar results and the third choice will change the position of the pad, which is not what we want
- Choose the option to **Fit the retaining edge**.
- Click on the **OK** button.



The retaining edge has now been fitted to the site model.



The pad with retaining edge is extremely useful because allows you to create a pad with a very tight edge without having to worry about a grade limits.

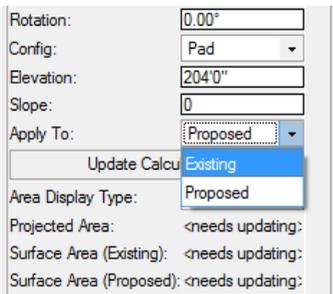
Existing Or Proposed Site Model

When you create a site modifier you can choose if it applies to the proposed site model of the existing site model. The existing site model is supposed to show the conditions of the site before you start to modify it. The proposed site model shows the site after you change it.

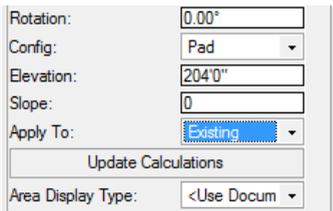
The idea is to try to make the site model as close to the real site as possible. You can use site modifier to do this by applying them to the existing model.

When Vectorworks calculates the Cut and Fill of the project, it calculates the difference between the existing and proposed site models.

- Select the Site Modifier.
- Go to the Object Info palette.
- Click on the Apply pop-up menu



- Choose Existing.



The Site Modifier will be applied to the existing site model and it will not be calculated for Cut and Fill.

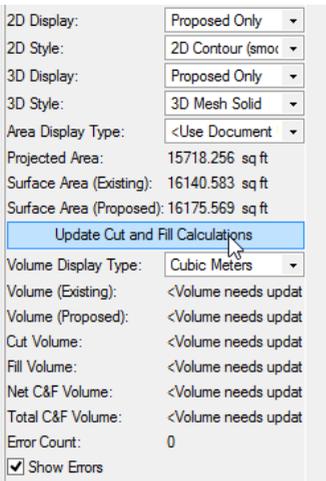
Cut and Fill Calculations

You need 2 things for cut and fill calculations, a **Site Model** and a **Site Modifier**. The first one should be obvious, with a out a Site Model Vectorworks has no way or calculating the site. Without **Site Modifiers** there is no need for cut and fill.

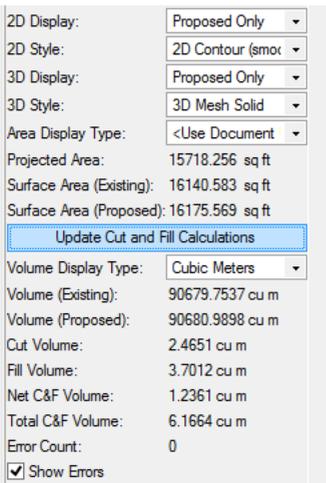
The cut and fill calculations are shown on the **Object Info** palette when you select a Site Model.

If the cut and fill calculations are not shown, then they need to be updated.

- Go to the **Object Info** palette.



- Click on the **Update Cut and Fill Calculations** button. Vectorworks will carry out the calculations. It can take some time. When I was writing these notes, Vectorworks took over five minutes to finish the calculation.



When the calculations are done Vectorworks will show the cut volume, the

fill volume and the net C&F volume. In this case the net amount is a cut volume that needs to be removed from the site. This volume does not include the expansion of the soil as you cut it.

As well as calculating the cut and fill of the entire site, you can also see the cut and fill volumes on each site modif

Hardscape

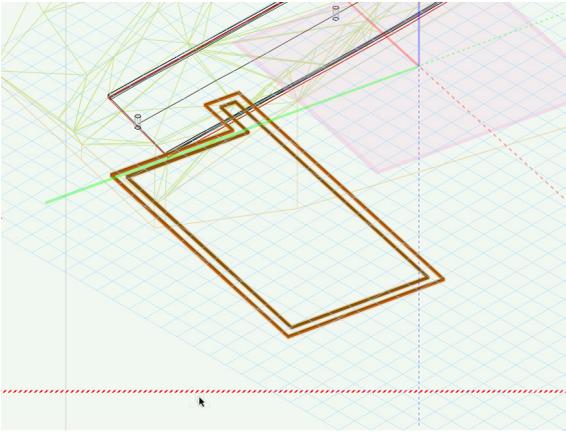
Hardscape is a special tool that makes it easy to draw areas of paving. This Hardscape can be 2D only, or it can be 2D and 3D. If you make it 3D, then it can be a Site Modifier and can affect the Site Model.

- Change to a **Top/Plan** view.
- Draw a rotated rectangle centred on one of the contour lines.
- Go to the **Menu** bar.
- Choose **Modify > Convert > Objects from Polyline...**
- From the **Object Type** pop-up menu choose **Hardscape**.
- Vectorworks has made the rectangle into a Hardscape object, but it can't be used as a Site Modifier yet.
- Go to the **Object Info** palette.
- Click on the **Hardscape Settings...** button.

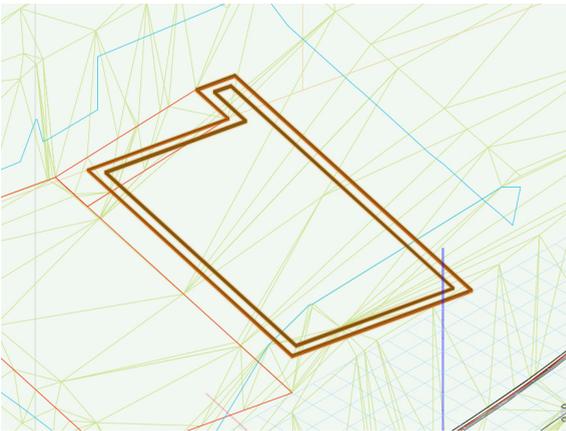
There are several settings here to make the Hardscape look better, but the important setting for site modifying is the one at the bottom-right, **Draw 3D**.



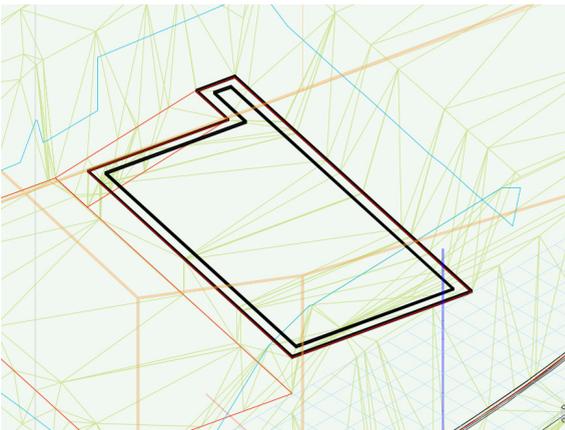
- Set the **3D Type** to **Pad Modifier**.
- Click on the **OK** button.



- Go to the **Object Info** palette.
- Change the Z value (elevation) to the desired height for the Hardscape.



- Select the Site Model and update it.

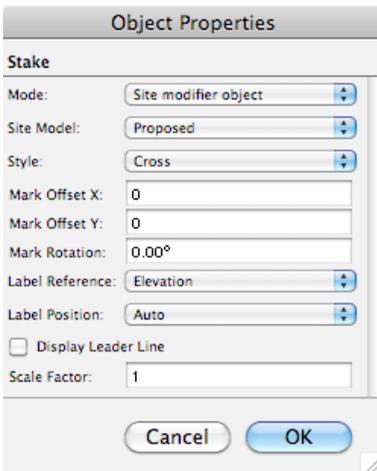


You still need a Boundary around the Hardscape. You can only use the Hardscape for flat surfaces, it can not be sloped if you are using Vectorworks 2015 or earlier. If you are using Vectorworks 2016 or later, the hardscape can be sloped.

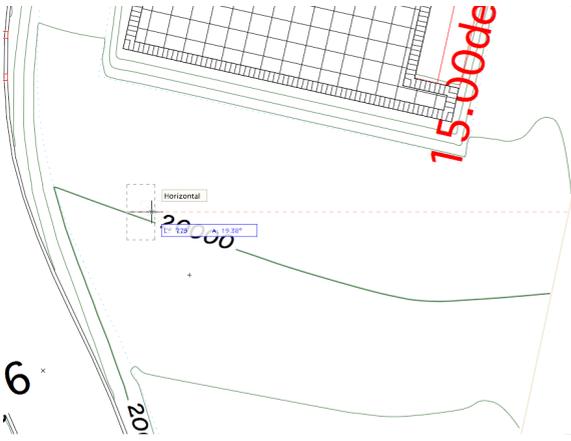
Stake Object

You can use the Stake Object to help create a Site Model. You can use the Stake Object on a Site Model to give the spot height. And you can use the Stake Object to edit your site, or modify the site.

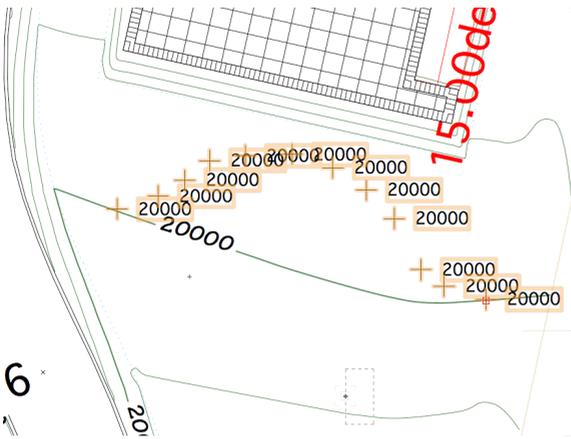
- Change to a **Top** or **Top/Plan** View.
- Go to the **Site Planning** toolset.
- Choose the **Stake Object**.
- Go to the **Tool** bar.
- Click on the **Preferences** button, the last button on the tool bar.
- Set the Mode to **Site Modifier object**.
- Set the Site Model to **Proposed**. If you were trying to edit the existing Site Model to match the surveyor's work, this would be a good way to do it.
- Click on the **OK** button.



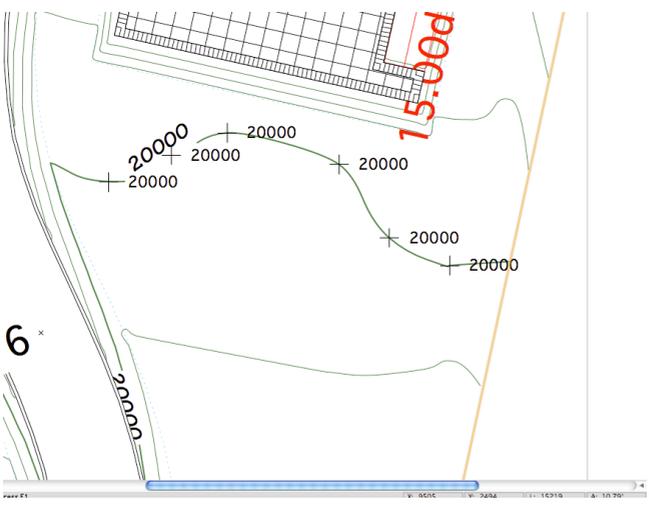
- Go to the **Tool** bar.
- Click on the **second mode** place a series of Stake Objects.
- Set the contour line height on the **Tool** bar (Vectorworks 2012).
- Place a Stake Object on a contour line.



- Go to the **Object Info** palette.
- Set the Z value (elevation) to the desired height of the contour.
- Notice how the Stake Object shows the height.
- Copy several of these Stake Objects. The new contour will follow the line of the Stake Objects.



- Draw a Boundary around the Stake Objects.
- Update the Site Model to see the revised contours.



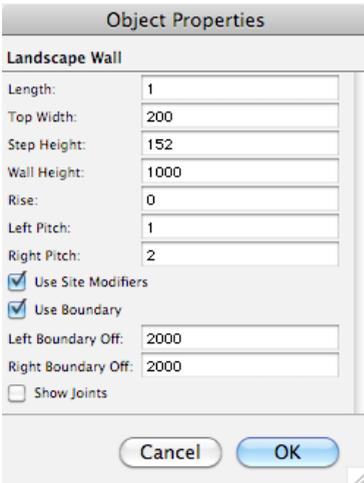
Landscape Wall

The **Landscape Wall** is only available if you have Vectorworks **Landmark** or **Designer**. The tool is useful because it can place a wall and modify the site at the same time, but it does not draw a wall in the same way as the wall tool. You just get a single wall, and you can not join the wall neatly to other walls. It does not have a fit walls to 3D geometry function like the regular wall does.

- Change to a **Top/Plan** view.
- Go to the **Site Planning** toolset.
- Choose the **Landscape Wall**.

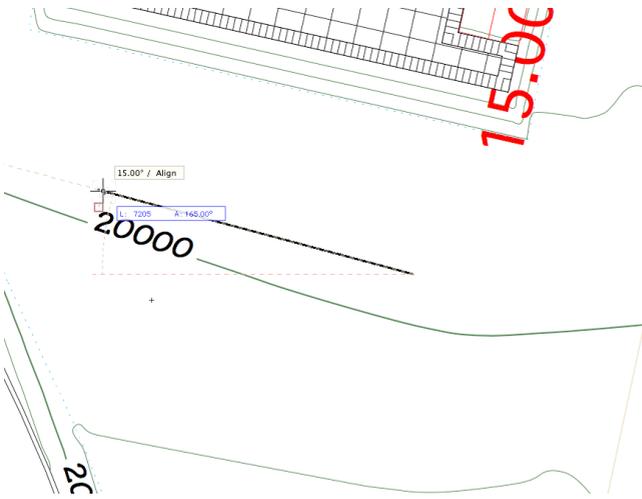


- Go to the **Tool** bar.
- Click on the **Preferences** button, the last button on the tool bar.
- Set the preferences to suit your project.

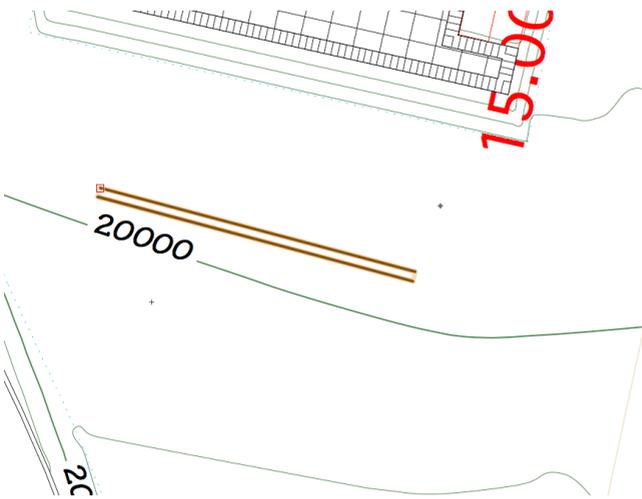


- Turn on the option to **Use Boundary**. Set the Site Model to **Proposed**.
- Set the Left Boundary Off and the Right Boundary Off to a reasonable amount. I have used **2m (6')**.
- Click on the **OK** button.
- Move the right end where you want a landscape wall.

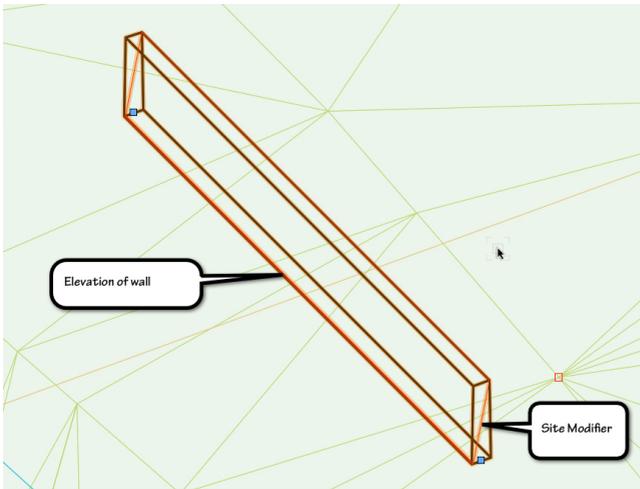
- Click once.
- Move across to the left.



- Click once.
- Vectorworks places the **Landscape Wall**.

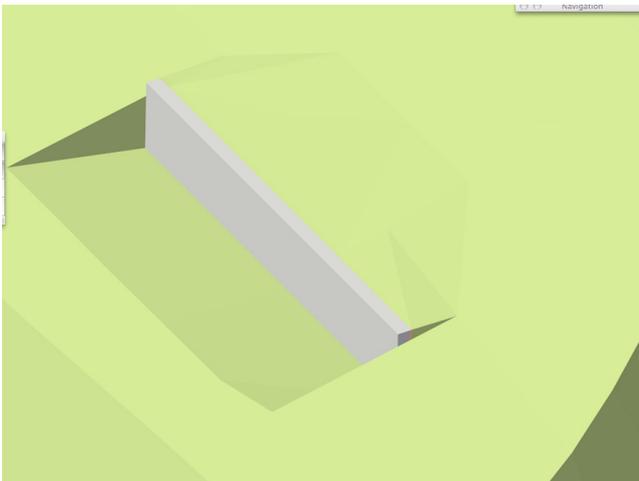


- Go to the **Menu** bar.
- Choose **Landmark > Send to Surface**. This will send the bottom of your wall to the Site Model. It will use the centre of your wall, so, if your wall is not along the contour the results will not be what you expected.
- Go to the **Object Info** palette .
- Move the wall down to the desired elevation.



- Update the Site Model to see the revised contours.

If you change to a 3D view and render it you can see the results.

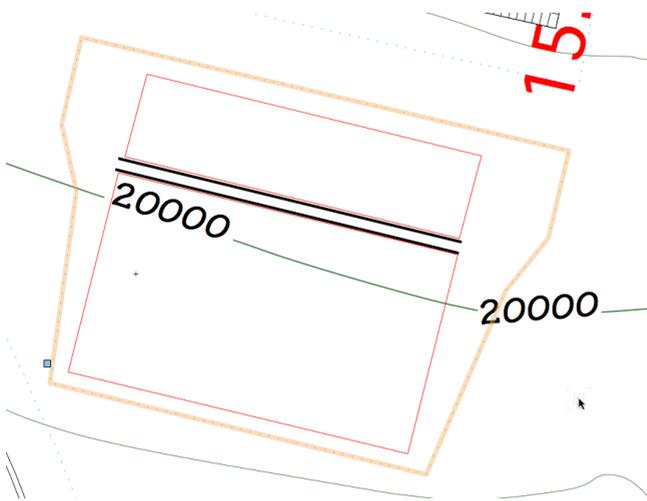


You can improve the landscape wall.

- Turn off the Boundary option.
- Create a Site Modifier pad for the bottom area of the wall, create another one for the top area of the wall.

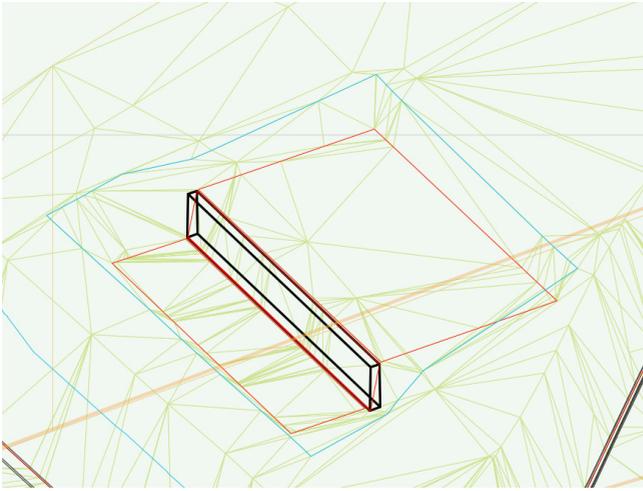


- Create a Boundary to suit the situation.



- Update the Site Model.

Creating extra pads and a Boundary of your choice gives you more control over the site modifying.



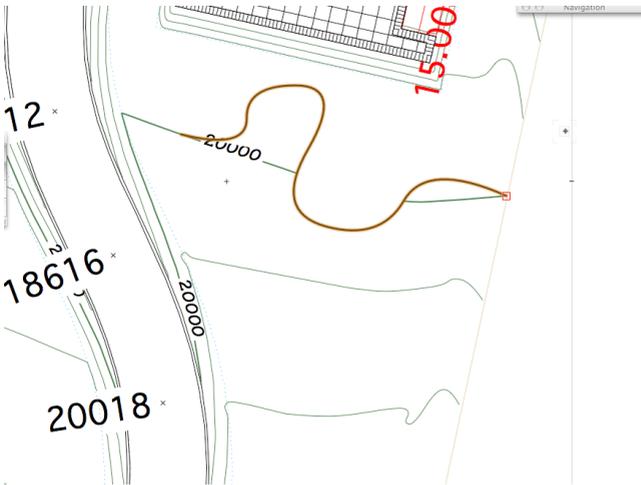
The **Landscape Wall Arc** is similar to the straight landscape wall.

3D Polylines

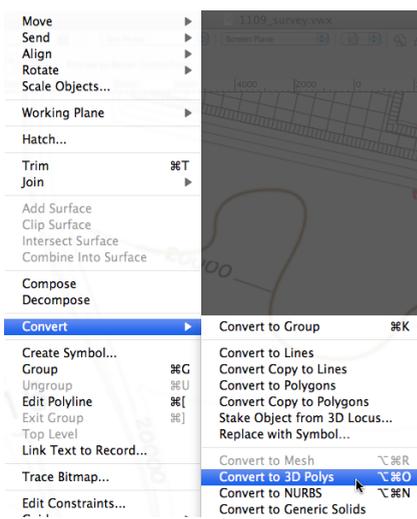
You can use a 3D polyline to create a Site Modifier, you do not always have to use the standard Vectorworks tools. If you use a 3D object it does not have to be planar, you can follow or use other 3D object to create the 3D polyline.

With Vectorworks 2016, you might think that the Contour Mode replaces this technique, but this is still a useful technique.

- Create a polyline, polygon, or other shape. You can use any shape with this technique.

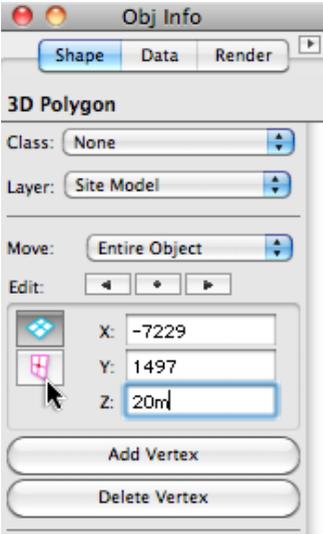


- Select the object.
- Go to the **Menu** bar.
- Choose **Modify > Convert > Convert to 3D Polys.**

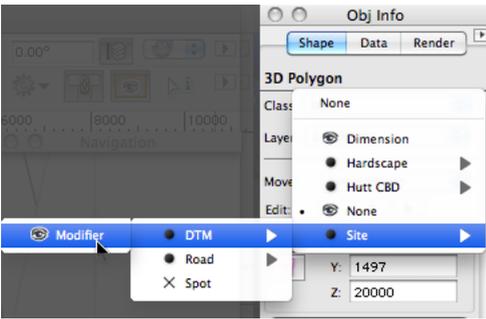


- The object is now a 3D Poly.
- Set the object to the desired height, or set each vertex to the required

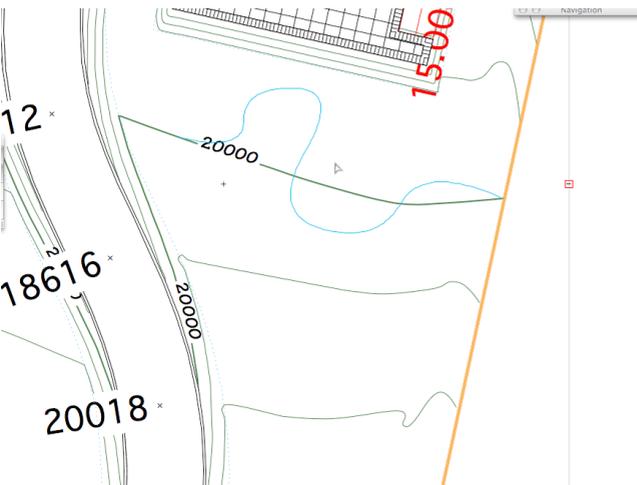
height (you can move the vertices individually) on the Object Info palette.



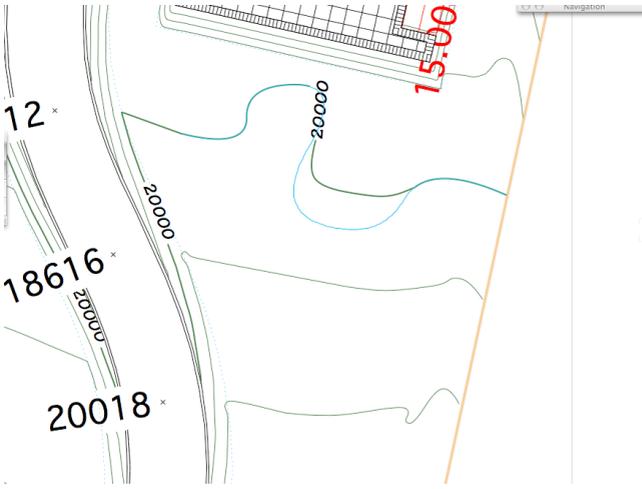
- Assign the object to the class Site-DTM-Modifier. This is important, if you do not place the object on this class, it will not be used as a modifier.



- When you have changed the class of the object, it will change colour.
- Add a Boundary.



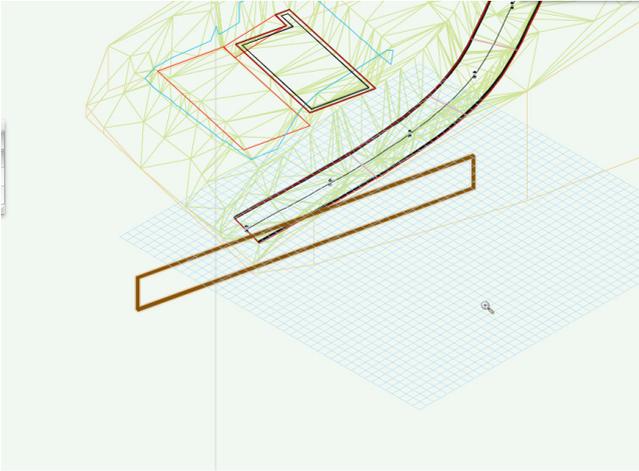
- Update the Site Model to see the changes.



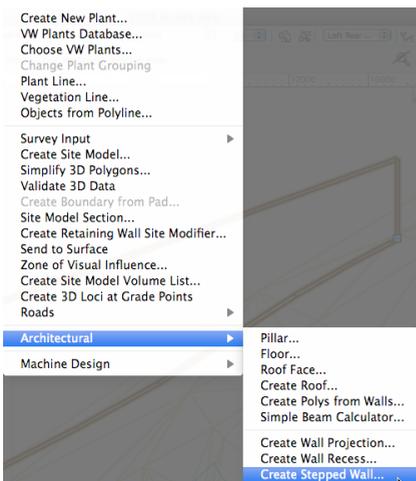
Stepped Wall

This is not a Site Modifier, it does not affect the site, but it uses the site to create a stepped wall. The command to create a stepped wall is in the Landmark or AEC menu.

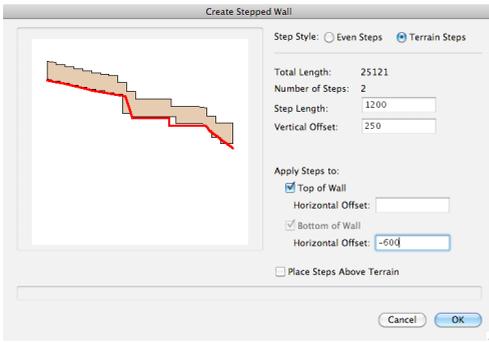
- Draw a wall on a Site Model.
- Set the wall to the desired height.



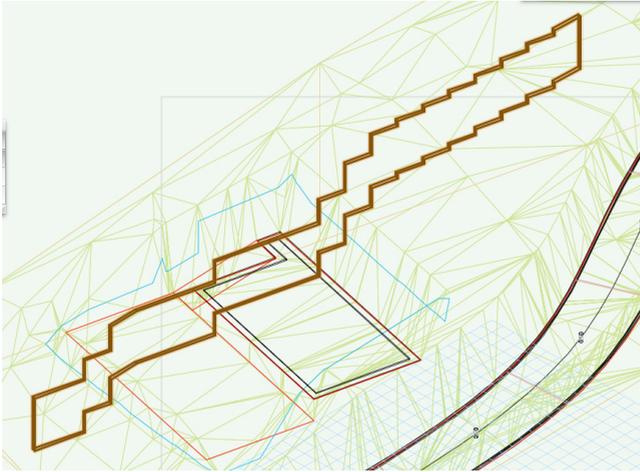
- Go to the **Menu** bar.
- If you have Vectorworks Landmark, choose **Landmark > Architectural > Create Stepped Wall...**
- If you have Vectorworks Architect choose **AEC > Create Stepped Wall...**



- Fill in the settings. Try using different step length and offsets.
- Click on the **OK** button.



Vectorworks tries to get your wall to set along the Site Model.



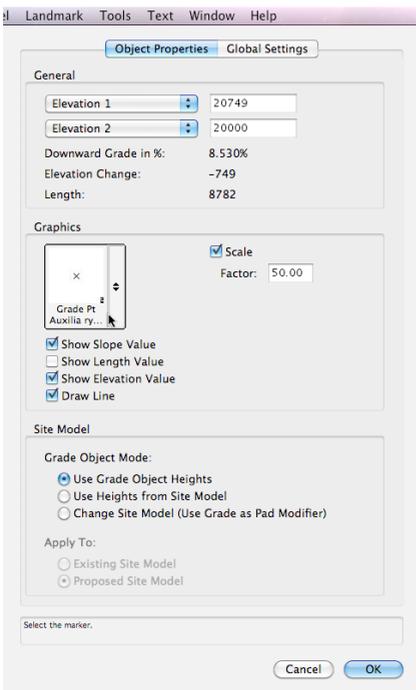
Grade Tool

The **Grade Tool** can be used to show the existing grade (or slope) of the site, from the start to the end of the grade line. This is a reporting mode. You can also use the **Grade Tool** to define the grade (slope) you want. Vectorworks will change the Site Model to suit.

- Go to the **Site Planning** tool set
- Click on the **Grade Tool**.

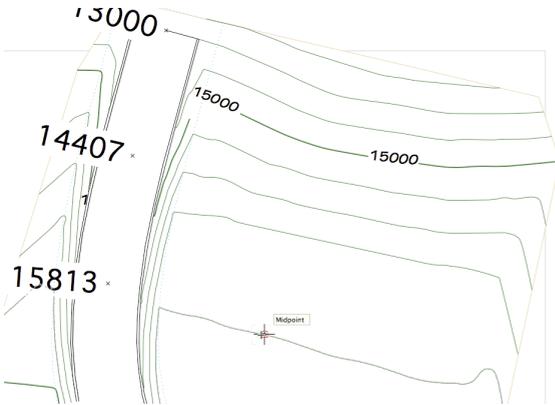


- Go to the **Tool bar**.
- Click on the **Preferences** button. There are several settings here that you can modify. To use the **Grade Tool** as a Site Modifier, you just need to change the Grade Object Mode (under Site Model settings) to **Change Site Model**.
- Click on the **OK** button.



- Click once at the upper part of your Site Model where you want to start

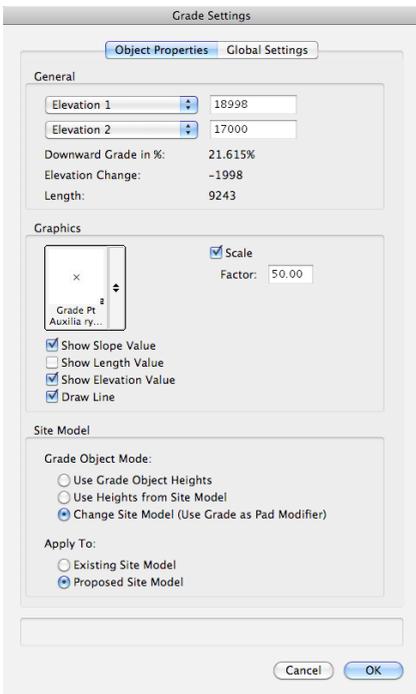
the grading. Vectorworks will use the elevation of your Site Model at this location.



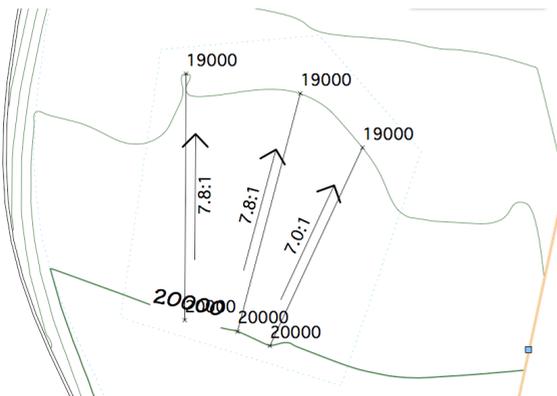
- Move to the place where you want to stop the grading.
- Click once.



- The **Grade Settings (Preferences)** window will open..
- Enter the Elevation 2 that you want the new site to have.
- Ensure that the **Grade Object Mode** is set to **Change Site Model**.
- Click on the **OK** button.



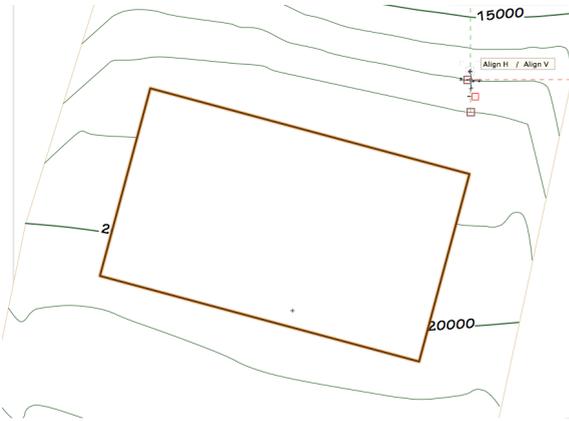
- Repeat this several times as required.
- Create a **Boundary** (under **Site Modifiers**) around the newly created **Grade** objects.
- Update your **Site Model** to see the changes.



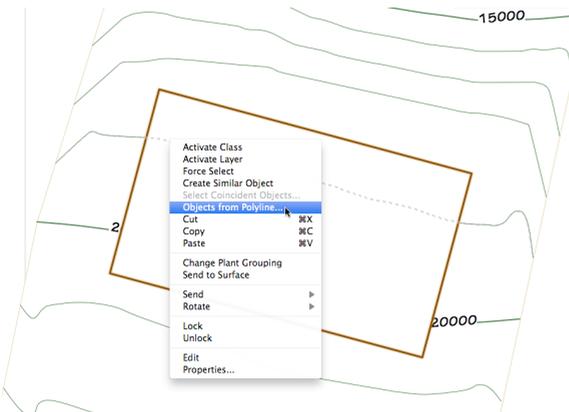
Texture Bed

The **Texture Bed** can be used to show areas of the site colored or textured. An example might be if you wanted to show different stages of the project.

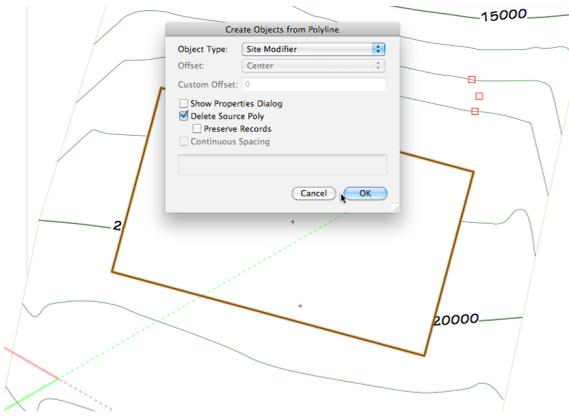
- Create an area.



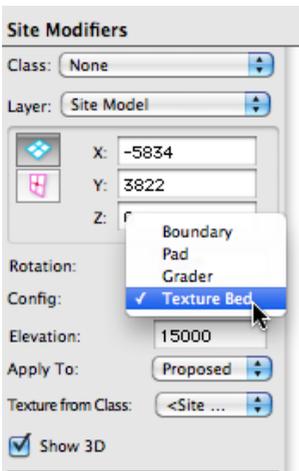
- Use the **Object from Polyline** command under the **Modify** (2011) or **Landmark** (2012) or **AEC** (2012) menu.



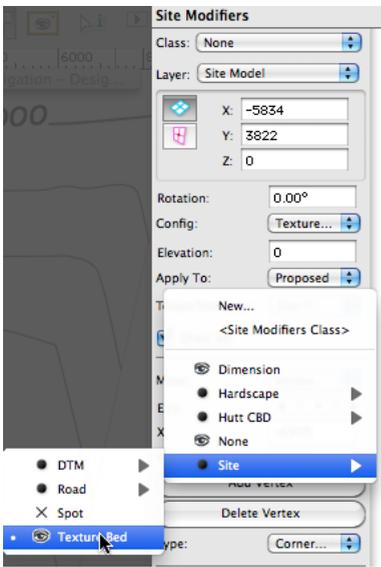
- Convert the object into a **Site Modifier**.
- Click on the **OK** button.



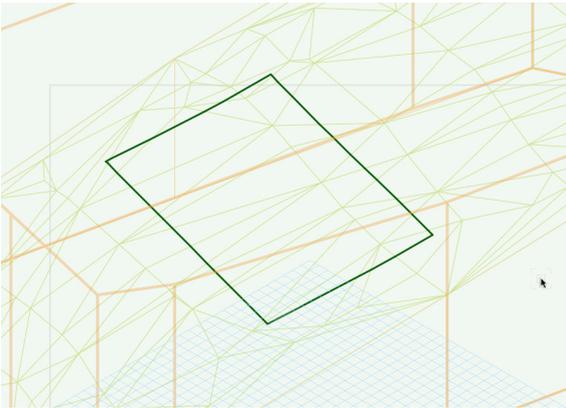
- Go to the **Object Info** palette.
- Change the Site Modifier to a **Texture Bed**.



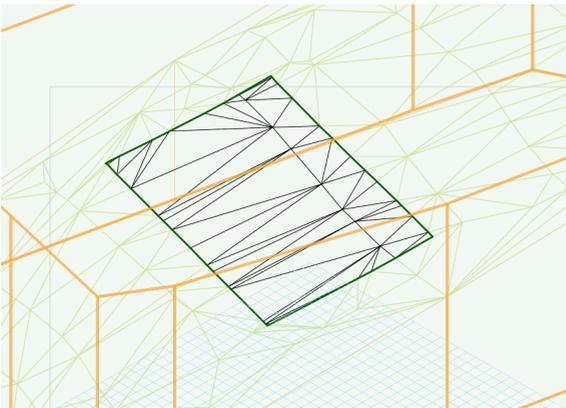
- Click on the **Texture from Class** option.
- Choose a class for the texture bed. In this example, I am going to use the same class as I used for the road.
- Just watch out for the **Elevation** settings. Any positive dimension in the **Elevation** will set the texture bed above the Site Model. 15m in the **Elevation** will float the **Texture Bed** 15m above the Site Model.



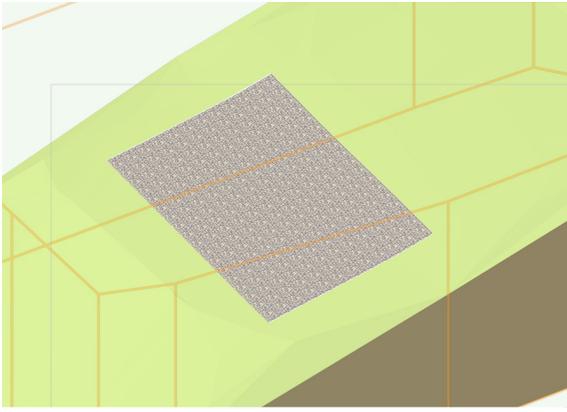
- If you change to a 3D view, you can see the **Texture Bed**.



- Update the **Site Model** to see the newly created **Texture Bed**.



- Render the view to see the texture on the **Texture Bed**.



Thank you

We trust that you have enjoyed working through this manual and that it has been informative and constructive.

For more information, please visit: <http://learn.archoncad.com>. If you just want someone to help you learn Vectorworks, to carry out some Vectorworks contract work, or you want someone to make Vectorworks easier, contact us, as this is a service that we also offer:

jon@archoncad.com.

Thank you again,
Jonathan Pickup
June 2015

